REMARKS

The December 16, 2008 Office Action has been carefully studied and reviewed. Claims 1-10 stand rejected. Based on the amendments and remarks made herein, Applicant respectfully submits that the present application is in condition for allowance. Action to such affect is respectfully requested.

Drawing Objections

The Patent Office objects to the drawings because "the means for coupling the claimed 'transmit signal' along with the claimed input terminals receiving the signals from the transconductance stages must be shown or the feature(s) canceled from the claim(s)." Claim 1 is the only claim which refers to a transmit signal. According to claim 1, a line driver has output terminals connected to a load for supplying a transmit signal to the load. Figure 2 of the instant application is reproduced immediately below for ease of reference. Figure 2 clearly shows the output terminals of a line driver (3) connected to a load (ZL) for supplying a transmit signal to the load.

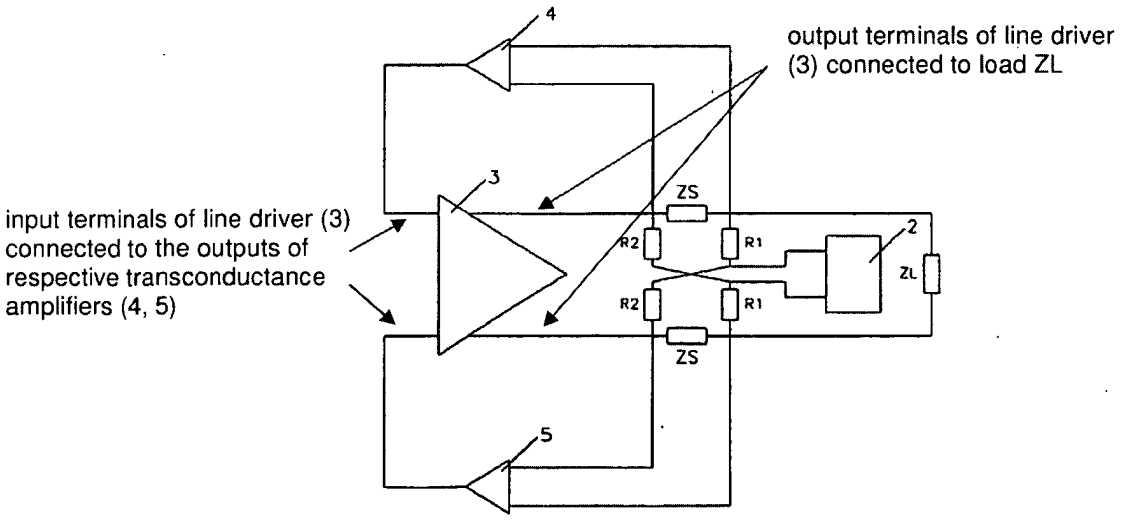

Figure 2 also shows the input terminals of the line driver (3) being connected to the outputs of respective transconductance amplifiers (4, 5) so that the line driver can receive signals from the

transconductance amplifiers. As such, Applicant respectfully submits that the drawings show the claim features identified by the Examiner and requests withdrawal of the drawing objections.

35 U.S.C. §112, First Paragraph Claim Rejections

Claims 1-10 stand rejected under 35 U.S.C. §112, first paragraph for allegedly failing to comply with the enablement requirement. First, the Examiner argues that the specification must describe where the signal to be transmitted "comes from" because the transconductance amplifier outputs are fed back to the inputs of the line driver and thus the interface between the input to the transmitter stage and the feedback paths from the transconductance amplifiers must be disclosed or enabled by the specification. It is irrelevant where the signal to be transmitted "comes from." Any desired signal can be transmitted using the line driver/receiver circuits of Figures 1 and 2. For example, the Background section of the instant application suggests ADSL (asymmetric digital subscriber line) signals can be transmitted and received using the line driver/receiver circuit of Figure 1.

In addition, Figure 2 shows the claimed line driver input terminals. Particularly, Figure 2 shows the transconductance amplifier outputs being coupled to the line driver input terminals as shown and explained above. The Figures do not show the transmission signal actually being input at the line driver input terminals. However, it is well known in the electronics arts how to input a signal to a line driver circuit. It is also well known in the electronics arts how to couple a feedback signal to the same line driver inputs. One skilled in the art could readily input any type of desired signal to the line driver input terminals shown in Figure 2. For example, it is well known in the electronics arts that the feedback signals shown in Figure 2 can be superimposed on the signal to be transmitted at the line driver input terminals. In addition, the crux of the invention is not related to the generation of the signal to be transmitted. Instead, the invention is directed to bringing about good echo cancellation in line driver/receiver circuits with active termination impedance. Fore example, see paragraph [0016] of the published application.

The Examiner also finds the relationship between the first impedances and the load impedance to be unclear. In response, the claims have been amended herein to specify that the first impedances are complex impedances of an impedance value that is much smaller than an impedance value of the load **so that a drive/termination impedance of the line driver matches the load impedance**. Echo cancellation is brought about by matching the drive/termination impedance of a line driver to that of the load as newly claimed. No new matter is added by way of these claim amendments. For example, see paragraphs [0021] and [0029]-[31] of the published application which describe the different impedance relationships for the novel line driver/receiver circuit. Particularly, paragraph [0031] states that the drive/termination impedance of the line driver equals kxZS, where ZS in Figure 2 represents the complex sense impedances coupling the line driver output terminals to the load and k is a function of the gains of the line driver (3) and the transconductance amplifiers (4, 5). Paragraph [0031] further states that the drive/termination impedance of the line driver is correctly matched to the load impedance when kxZS=ZL, where ZL is the load impedance. Thus, any combination of k and ZS that fulfills this equation can be chosen as described at the end of paragraphs [0021] and [0031] of the instant application.

Finally, the Examiner argues that claims 2, 6, 10 and their respective dependents violate the first paragraph of 35 U.S.C. §112 because "Applicant has claimed a relationship that is indeterminate because the disclosed circuit is incomplete and no functional relationships between the gain stages are give." Applicant respectfully disagrees. The claims at issue state that the drive/termination impedance of the line driver equals the impedance value of one of the first impedances multiplied by k, wherein k is a function of the line driver gain and the transconductance amplifier gains. As explained above, paragraphs [0021] and [0031] of the published application state that any combination of k and complex sense impedances ZS can be chosen that fulfills the equation kxZS=ZL since kxZS represents the line driver termination

impedance and echo cancellation is optimized when the line driver termination impedance matches the load impedance as claimed.

In view of the claim amendments made herein and the remarks above, Applicant respectfully submits that all §112, first paragraph claim amendments are now moot. Accordingly, Applicant respectfully requests withdrawal of the §112, first paragraph claim rejections.

35 U.S.C. §112, Second Paragraph Claim Rejections

Claims 1-10 stand rejected under 35 U.S.C. §112, second paragraph for allegedly being indefinite. First, the Examiner argues that the "there are no specific values or examples or even specific protocol or load values disclosed" and therefore it is unclear what is mean by an impedance value that is 'much smaller' than a load impedance. In view of the claim amendments explained above, this argument is now moot. The claims have been amended to specify a particular relationship between the different impedances. Mainly, the claims now specify that the first impedances are complex impedances of an impedance value that is much smaller than an impedance value of the load **so that a drive/termination impedance of the line driver matches the load impedance**.

The Examiner also argues that the claimed impedances and the first-fourth resistors of claims 4-5 and 8-9 are not separately shown in the drawings. Applicant respectfully disagrees. Figure 2 clearly shows an embodiment where there are two complex impedances (ZS) each coupling a different output terminal of the line driver (3) to the load (ZL). Figure 2 also shows four different resistors (R1-R4) coupled to the two complex impedances (ZS) in a particular configuration. As such, the first-fourth resistors of claims 4-5 and 8-9 are shown separately in Figure 2 from the claimed first complex impedances. Accordingly, Applicant respectfully requests withdrawal of all §112, second paragraph claim rejections.

Conclusion

In view of the amendments and remarks made herein, Applicant respectfully submits that the present application is now in condition for immediate allowance. Action to such affect is respectfully requested. The Examiner is encouraged to contact Applicants' attorney at (919)-854-1844 if any outstanding matters can be readily addressed by a phone call.

Respectfully submitted,
COATS & BENNETT, P.L.L.C.

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